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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/764,805

Filing Date: January 26, 2004

Appellant(s): KAKIUCHI ET AL.

Andy M. Han (60,266)
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed March 16, 2009 appealing from the Office action mailed October 17, 2008 (non-final, but final rejection was mailed 4/10/08).

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

Application number	Status
10/406109	Defective Brief, Suppl. Brief filed 4/24/09
10/684981	Appeal Docketed 01/2/09
10/717831	Appeal Docketed 4/7/09
10/748979	Appeal Docketed 4/1/09

These are related applications and the Board of Patent Appeals may find them to have a bearing on the instant appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 6,033,752	Suzuki et al.	03/2000
CN 1330368	Hsu et al. (aka Xu et al.)	01/2002
EP 122723	Aratani et al.	08/2001
US 4,670,345	Morimoto et al.	06/1987
JP 59-225992	Shigeta et al.	12/1984
JP 2000-285509	Kinoshita et al.	10/2000
JP 10-143919	Yoshida et al.	05/1998

US2001/0021160 Shuy et al. 09/2001

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Xu et al. CN 1330368 or Shuy et al. '160, in view of Suzuki et al. '752, Morimoto et al. '345, Shigeta et al. JP 59-225992 and Kinoshita et al. JP 2000-285509 (machine translation enclosed), combined with either of (Yoshida et al. JP 10-143919 or Aratani et al. EP 1122723),

Xu et al. CN 1330368 teaches a transparent layer of Ge, Si, GaP, InP, GaAs, InAs, ZnSb, TiO₂, Sb-Zn oxide as a transparent layer (30) and reflective layer (40) may be Ag, Al, Au, Pt, Cu, Sn, Ir, Ta and alloys and/or combinations thereof. (abstract). The transparent layer may be 5-500 nm thick (4/7-12) and the reflective layer may be 1-500 nm. (4/13-20). The example uses silicon and gold as the materials. In figure 1A, the provision of thermal manipulation layers (dielectric layers) is disclosed and the use of protective layers is disclosed. (60). The examiner has only had a spot translation made, if the applicant has a written English translation made the examiner would appreciate a copy with the next response. (Shuy et al. '160 is not the corresponding English document, although they are similar)

Shuy et al. '160 teaches a transparent layer of Ge, Si, GaP, InP, GaAs, InAs, ZnSb, TiO₂, Sb-Zn oxide as a transparent layer (30) in a thickness of 5-500 nm and reflective layer (40) may be Ag, Al, Au, Pt, Cu, Sn, Ir, Ta and alloys and/or combinations thereof in a thickness of 1-500 nm. [0026-0027]. The examples use silicon and gold as the materials. In figure 1A, the provision

of thermal manipulation layers (dielectric layers) is disclosed and the use of protective layers is disclosed. (60).

Suzuki et al. '752 teaches examples 68-71, which have a substrate, a first 10 nm In alloying sublayer, a second 10 nm Te alloying sublayer, a dielectric layer, an Al reflective layer and a 10 micron UV cured layer and the layers undergo alloying to cause a change in reflectance. (26/15-54 and table 7). Examples 43-49 (table 5 teach the use of a bedding layer between the substrate and the recording bilayer (col 21). The use of In, Sn, Pb, Zn or alloys including these for the first recordinglayer is disclosed. (6/1-16). Useful second layer materials include group 5B or 6B elements, such as As,Se,Sb, Te and alloys of these with other elements including Cu, and the like (6/59-7/35) The bedding layer can be various dielectric materials and prevent moisture penetration through the substrate into the recording layers (21/40-44 & 9/59-10/22). The addition of an upper dielectric and/or reflective layer between the recording layer and UV cured protective layer is disclosed for adjusting reflectance, regulating heat conduction and preventing corrosion of the recording layer (10/53-11/26). The protective layer can be 0.1- 100 microns in thickness (9/3-7)

Yoshida et al. JP 10-143919 (machine translation attached) teaches the addition of Al to Cu in amounts of 1-30% to improve the corrosion resistance [0017]. The addition of Fe, Mn, Au, Pt, Pd, Ti, Mo, Ta, Zr, V, W, etc in amounts of 0.1-10% to further improve the corrosion resistance is disclosed [0018]. Example 4 uses 20% Al. [0033].

Aratani et al. EP 1122723 teach reflective layer composition and exemplify $\text{Cu}_{82.5}\text{Al}_{17.5}$ (table 2, page 7). The reflective films functions to allow recording [0044-0045]. Useful Cu based alloys are disclosed. [0050-0051].

Morimoto et al. '345 teaches that the reflective layer may be on the same side of the recording film as the substrate if topside recording is to be used and on the opposite side of the recording films from the substrate if recording is to take place through the substrate (6/42-65). The dielectric layers (metallic compounds layers) are disclosed as providing improvements in the stability and sensitivity (7/42-8/12). The prevention of direct contact with the recording layer is disclosed. (7/1-10). The protective layer can be organic materials (14/62-15/5).

Shigeta et al. JP 59-225992 teach mixing of layers (1) and (2) and establishes that the order is not important (see figures). The use of a Cu layer as the metal and SnO₂, ZnO, Al₂O₃, In₂O₃ oxide layers is disclosed in table 2.

Kinoshita et al. JP 2000-285509 teach with respect to drawing 1, a substrate, an Au layer, a dielectric layer, a 10 nm Al layer a Ge layer and a protective layer [0015-0016].

It would have been obvious to one skilled in the art to modify the examples corresponding to figure 1A of either Xu et al. CN 1330368 or Shuy et al. '160 by using **Cu alloys** with less than 10-30% of Al, such as those disclosed by either of Yoshida et al. JP 10-143919 or Aratani et al. EP 1122723 in place of the Au layer with a reasonable expectation of forming a useful alloying optical recording medium based upon the disclosure of equivalence of the reflective layer materials including Cu alloys by either Xu et al. CN 1330368 or Shuy et al. '160, where the Cu layer does not suffer from corrosion based upon the teachings of either of Yoshida et al. JP 10-143919 or Aratani et al. EP 1122723 and to add a reflective layer between layers 50 and 60 as taught by Suzuki et al. '752 to adjust the reflectivity. Further, it would have been obvious to modify the resulting media by using other disclosed transparent layer materials, such as InP, ZnSb, InAs or Ge in place of the Si used in the example with a reasonable

expectation of forming a useful alloying optical recording and further to reverse the order of the two films forming the bilayer as discussed by Shigeta et al. JP 59-225992 with a reasonable expectation of the recording medium functioning based upon the disclosure of equivalence of the two orientations and/or placing the reflective layer between the substrate and layer 20 to allow recording with the light incident through the protective layer based upon the disclosure of the function of the reflective layer on either side by Morimoto et al. '345 and the prior use of this ordering in the alloying media of Kinoshita et al. JP 2000-285509, which lends a reasonable expectation of success.

In response to the arguments, the examiner notes that corrosion of Cu is known in the art as evidenced by Yoshida et al. JP 10-143919 or Aratani et al. EP 1122723 and that corrosion of the alloying layers is known in the art as evidenced by Suzuki et al. '752, which describes the addition of dielectric layers as a mode for addressing this. In the case of the addition of a reflective layer between layers 50 and 60 of figure 1A as discussed in the rejection, the recording layer is between transparent layer 20 and the reflective layer. The claims rejected under this heading do not recite the position of the light transmission layer as the outermost layer as claims 9 and 15-18 do. The claims require at least one recording bilayer and so a single alloying bilayer is embraced by the claims, the applicants use of the 'plurality' language in the arguments is reaching and fails to clearly account for the embodiments where a single recording bilayer is used. The Xu et al. CN 1330368, Shuy et al. '160 and Suzuki et al. '752 each include alloying bilayers and so that embodiment is clearly taught. The instant application could present data evidencing an unobvious result by comparing the Cu alloy embodiments of the claimed

invention with those using only Cu in the recording layer, where the recording media are formed without contact with oxygen and kept under an inert atmosphere, such as argon or nitrogen, until testing. The applicant might use nitrides as the dielectric layer materials to accomplish this. This would allow the applicant to evidence unexpected results which are not dependent upon the anti-corrosion properties of the Cu-Al alloys of the claimed invention. Clearly, the motivation to add the Al to prevent/reduce corrosion of the Cu layer is present in the art as evidenced by Yoshida et al. JP 10-143919 or Aratani et al. EP 1122723 and further the desire to prevent corrosion in alloying recording layers is known as evidenced in Suzuki et al. '752, so the prior art of record, which is all within the optical recording media art, does serve to direct one to the addition of Al to the Cu layer.

The examiner notes that the claims are all directed to the media, and the thicknesses of the recording sub layers/bilayers is taught in the art, thereby rendering the recited reflectance properties obvious or more properly anticipated by the media rendered obvious by the rejection above. The use of the laser need not be shown as this is not part of the medium, nor are the claims directed to the method of use.

The examiner discusses the thickness of each of the layers forming the recording bilayer to address the issue of the light transmittance of the recorded regions recited in claims 20-25. These values will be dependent upon the thickness of the layers which make up the recording bilayer. The applicant point to the data in figure 17 which evidences reduced jitter for the range of 10-30 % Al. The examiner notes that the entire range of jitter shown in that figure is ~5.5 to 7.5%, so the showing is not pronounced enough to warrant patentability. Further, there is a basis for the addition of Al to Cu layer to reduce corrosion in the prior art reduce corrosion. In

response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The applicant admits on page 8 of the response that Shuy et al. teach alloys of Cu and Al, but fails to appreciate that the lack of a teachings of amounts/proportions is made up in the other references, which describe corrosion resistance as a reason to add Al to Cu, a benefit which would reasonably be realized in the media resulting from the combination of either Xu et al. CN 1330368 or Shuy et al. '160, in view of Suzuki et al. '752 combined with either of Yoshida et al. JP 10-143919 or Aratani et al. EP 1122723. The reduced reflectivity when too much I is present would also affect the difference in the refractivity/transmittance of the recorded/unrecorded areas and reduce the contrast between them. This addresses the issue of the difference in jitter raised by the applicant.

In response to the arguments of 08/21/2008, translation of JP 59-225992 and CN 1330368 are made of record. These were of record in application 10/406109 as of 01/024/08. It is clear in the office actions that the examiner is relying upon the documents themselves. The amendment to the claims limits the claims to embodiments where the reflective layer is on the substrate side of the recording bilayer as otherwise the light does not reach the recording bilayer when exposed through the protective layer. The claims merely add the reflective layer between the substrate and dielectric layer adjacent the recording bilayer of Xu et al. CN 1330368 or Shuy et al. '160 in a manner similar to that shown in Suzuki et al. '752, but on the opposite side of the recording bilayer from that exemplified in the Suzuki et al. '752 reference. The viability of this

alternative ordering is provided by Morimoto et al. '345 and Kinoshita et al. JP 2000-285509, who teach the use of the reflective layer adjacent to the substrate and Shigeta et al. JP 59-225992 who teaches the equivalence of the order of the two layers which form the recording bilayer. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). It is well appreciated that two materials having a different electromotive potential in contact will cause corrosion of one of these. The most common example of this is copper in contact with other metals, such as Al or Fe as these are common building materials used together and cause leaks in the water pipes of homeowners. The effects of corrosion on copper layers in optical recording media is appreciated in the art as is the use of alloying to ameliorate its effects as evidenced by Yoshida et al. JP 10-143919 and Aratani et al. EP 1122723. The applicant may have a basis for arguing that the thickness of the layers forming the recording bilayers is optimized for recording/readout with lasers operating in the 380-450 nm range. The language describing the small transmittance differences fails to appreciate that with the reflective layer, the recording process uses the change in the refractive index of the bilayer areas and the mixed areas as discussed in Suzuki et al. at 7/58-8/19 (push-pull). Therefore the change in the transmittance is not relied upon as argued/implied by the applicant and there is no benefit ascribed to this. The examiner notes that at this point the position argued is one of intended use as there are no method claims under prosecution.

(10) Response to Argument

The applicant states that the examiner has not established a *prima facie* case of obviousness, arguing that the prior art fails to disclose the combination of limitations recited in the claims, no motivation to combine the references as suggested by the examiner, and no reasonable expectation of success, noting that the combination of Yoshida et al., Aratani et al. and Suzuki et al. record using a different "principle of operation". (brief at page 32).

With respect to claims 1-10, the applicant argues that neither Xu et al. or Shuy et al. disclose of suggest the first and second recording films of the claims where the second recording film is an alloy of Cu with 1—30% Al added. (brief at pages 33-34). The examiner points to the reflective layer (40) of the references being selected from Ag, Al, Au, Pt, Cu, In, Sn, W, Ir, Re, Rh, Ta, alloys and combinations thereof as admitted in the brief on pages 33- 34, in Shuy et al. at [0027] and Xu (Hsu) et al. at [0005] (translation at page 5). The examiner holds the position that this suggests any and all alloys of Cu and Al and provides a reasonable expectation of success in the functioning of the Cu-Al alloy in alloying media. This position is supported by the teachings of alloying of Al and Ge by Kinoshita et al. [0015-0016] and the teaching of Cu as an alloying recording sub-layer by Shigeta et al. (table 2).

The applicant argues that the secondary references fail to teach this limitation. (Brief at page 34). The position of the examiner is that the Xu and Shuy references teach and render obvious the recording bilayer where one recording layer is Si or Ge and the other is a Cu-Al alloy and these are sandwiched between dielectric layers with a substrate and a cover layer on opposite sides. The Aratani et al. and Yoshida et al. references establish that Cu-Al layers are

known in the optical recording media arts and that the effect of adding Al to Cu in amounts of 1-30% are known to prevent corrosion. So these references do provide the teachings argued as not found in the secondary references. The applicant argues on page 34 that Suzuki et al. does not provide the teachings of the alloy and the examiner agrees, noting that this is not what the references is relied upon by the examiner to teach.

The applicant argues that Yoshida et al. cannot cure the defect alleged because the mode of operation in the recording process is different (brief at page 35). This position fails to appreciate that the use of Cu, Al or alloys thereof in alloying recording media are rendered obvious by the teachings of Xu and Shuy. Further the references are all within the optical recording media art and therefore analogous and one skilled in the art would recognize that Cu layers irrespective of their function are known in the optical recording media art to be susceptible to corrosion.

The applicant argues that Aratani et al. cannot cure the defect alleged because the mode of operation in the recording process is different (brief at pages 35-36). This position fails to appreciate that the use of Cu, Al or alloys thereof in alloying recording media are rendered obvious by the teachings of Xu and Shuy. Further the references are all within the optical recording media art and therefore analogous and one skilled in the art would recognize that the Cu/Al layer is evidenced to be able to absorb light to generate heat and facilitate recording. As discussed previously, the combination of the Cu-Al layer with a Ge or Si layer to form a recording bilayer is known from Xu and Shuy.

The applicant argues on pages 36-37 that the recording medium having a structure, of substrate, reflective layer, a plurality of recording layer, at least one of which includes a first and

second recording layer and the first recording film is Si, Ge, Sn, Mg, In, Zn, or Bi as the primary component and the second recording film being and Cu-Al alloy. This position fails to appreciate the teachings of Suzuki et al. with respect to figure 4, where two recording bilayers are formed and these are adhered to each other through an adhesive layer (8). The provision of reflective layers is also taught in Suzuki et al. (9/45-58 and 10/53-61). The claims also do not require that the recording bilayers be separated from each other by other layers and therefore the teachings of Shigeta et al. regarding the use of plural alternating layers 1 and 2 illustrated in figures 2-5, which under the influence of the laser melt together (the semiconductor and composite layers) to form a alloyed area (Shigeta et al. translation in paragraph bridging pages 4 and 5.). This is compatible with the teachings of Xu and Shuy as the metals in the composite layer can be Cu, Al and alloys of these. (translation at page 5). In this case each bilayer (first and second film) is a recording layer within the language of the claims. The provision of the reflective layer so that the exposure is from one side being rendered obvious by the teachings of Morimoto and Kinoshita et al. who teaches the reflective layer adjacent the substrate, rather than the cover layer. As discussed above, Aritani and Yoshida et al. teach specific Cu-Al alloy layer composition recited in the claims.

The applicant argues that Suzuki et al. does not teach the recording layer composition. (brief at page 38). The examiner reiterates that the Suzuki et al. reference is not relied upon to teach the Cu-Al alloy layer and this is clear form the rejection.

The applicant repeats the position that Yoshida et al. and Aratani et al do not teach the recording bilayers of the claims, specifically the Cu-Al alloy layer in contact with the Si, Ge, Sn,

Mg, In, Zn, Bi or Al layer. (pages 39-40) The examiner repeats the position articulated above, that this is not what they are relied upon the teach.

The applicant argues on page 40, that the limitation of claim 20 is not taught. The examiner points out that the difference in the reflectivity between the recorded and unrecorded areas at 380-450 nm is not taught. The position of the examiner is that this is a function of the thin recording layers, which is taught in each of Xu, Shuy and Suzuki, which teach film thicknesses of ~5 nm and Suzuki et al. teaches the change in the refractive index, not the reflectance to readout the data in column 7/58-8/19. The issue of the magnitude of the change in the reflectance of the alloyed areas and the unalloyed areas is inherent in the media rendered obvious by the combination of the references applied. The issue raised by the applicant is a canard, noting that this is not how the media readout. The alloying of any bilayers rendered obvious by the combination of references inherently result in a similar refractive index change. One skilled in the art would recognize this from the teachings of Suzuki et al. with respect to In and In alloys and that this would apply to other alloying reactions. The issue of the wavelength is considerably less important than argued by the applicant as no method claims are under prosecution and so there is no requirement that the medium be used with the 380-450 nm wavelengths. The data argued by the applicant is more limited to specific methods of use, which is not claimed. The issue of plural recording layers argued on page 44 fails to account for the teachings of Suzuki and particularly Shigeta discussed above.

The arguments raised by the applicant on pages 45-48 have been addressed above and the responses above are relied upon without repeating them.

The applicant argues on pages 49-51 that there is no motivation. This position fails to appreciate that one of ordinary skill in the optical recording media art would have known about corrosion of Cu layers and the use of Al to reduce this based upon the teachings of Yoshida et al. in particular. The teachings of Xu et al. and Shuy et al. clearly provide direction to alloys for one of the alloying bilayers to be an Al-Cu alloy for the recording film. Further Kinoshita et al. establishes that Al will alloy with Si and Shigeta et all teaches Cu as the metal layer in alloying bilayers and particularly in combination with the teachings of Cu-Al alloys of Xu et al. and Shuy et al. with serve to establish a reasonable expectation of success. This addresses the issues raised on pages 53-55 of the brief.

11) Related Proceeding(s) Appendix

Copies of the court or Board decision(s) identified in the Related Appeals and Interferences section of this examiner's answer are not provided as there have been no decisions in those cases. Their status as of May 18, 2009 is as follows:

Application number	Status
10/406109	Defective Brief, Suppl. Brief filed 4/24/09
10/684981	Appeal Docketed 01/2/09
10/717831	Appeal Docketed 4/7/09
10/748979	Appeal Docketed 4/1/09

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Martin J Angebranndt/
Primary Examiner, Art Unit 1795

Conferees:

/Tom Dunn/

Quality Assurance Specialist, TC 1700

/Mark F. Huff/
Supervisory Patent Examiner, Art Unit 1795